

# The Trend of Medicine and Its Relationship To the Prevention of Disease\*

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BEFORE the time of Hippocrates, the practice of medicine was a matter of objective diagnosis, and during its early evolution some emphasis was placed on therapeutics. Subsequently attention was directed toward refinements in diagnosis, and by the twentieth century, diagnosis had become a relatively precise science. Ultimately therapeutics also became reasonably accurate, based as it was upon better knowledge of anatomic change and compensatory physiologic adjustment. In both circumstances the emphasis was placed on man in an abnormal state of health.

Today more is demanded of the physician than an interest in disease alone, for the practice of medicine transcends both diagnosis and therapeutics, which by themselves do not answer the modern challenge. At present it is demanded that the physician expend more effort toward the prevention of disease, thereby placing emphasis on understanding those factors which maintain man in equilibrium with his environment, rather than on those which precipitate illness. The physician is compelled to recognize the importance of the interaction of those situations which impinge upon and affect the equilibrium between man and his surroundings. Physicians of necessity must become philosophical biologists in order to have the maximum comprehension of the trend of medicine.

Unfortunately the curricula of modern medical schools have been over-burdened with the techniques of specialization and the minutiae of the sciences ancillary to medicine, and for that reason the more important subject of ecology has been excluded.

Because of the scientific advances in the conservation of health, more persons are allowed to live today than could have hoped to have survived a century ago. As a result the need for physicians with a philosophic viewpoint of biology becomes imperative. What crimes are committed under the license of science! One thing is certain, we shall perish or lose our leadership in direct proportion to our ignorance of those immutable laws which govern the actions and reactions of the human organism as it seeks to express itself in its environment, whether that be biologic, social, economic, or psychologic.

The categorical statement can be made that the

*vocation* of the physician should be the study of human beings seeking adjustment in their environments, his *avocation* the study of disease in individuals and in populations. The physician's vocation, then, impels him to study human ecology. In its essential nature ecology is the observation, enumeration, testing and synthesis of whatever can be known about life and environment, in order to interpret the relationships existing between them in practical terms.

An inquiry into the chain of events that makes the independent human being totally dependent in time and space upon his environment is of necessity an inquiry into human ecology. In fact, the human subject is absolutely dependent upon the most minute and apparently insignificant factors of his environment. He is a part of all he experiences, and disease is often the folly of an avoidable, unpleasant experience. If the physician were to know what elements of the external environment condition the human subject both qualitatively and quantitatively, he would be better prepared to assess the defense reactions of the internal environment, and thereby understand more fully the mechanisms of the production of disease in the individual.

How can a man be advised and treated for an internal, physiologic adjustment to an aberrant external stimulus if the physician fails to appreciate or is unaware of the part which environment and habit plays in the life of man? The physician should strive to know more about normal man, so that he will be able to understand the subtle factors which lead to devitalization and ultimate illness. Often in the search for the specific cause of disease, contributing elements such as psychologic conditioning, avoidable social pressures, insufficient leisure, poor nutrition, and other inevitable ecologic factors are overlooked.

One of the most important of these is the study of nutrition. Either too much or too little food may produce illness, and the intelligent application of the proper dietary regimen may cure it. Through application of the principles of good nutrition, emphasis is automatically placed on keeping man well. The expert in nutrition can advise what to eat, and why it should be eaten, but until the part which poor nutrition plays in the etiology of disease is appreciated, recognized and understood, this important causative factor of devitalization cannot be successfully combated or prevented. There is much hidden hunger in our land of plenty, much devitalization that goes unheeded, and much disease that is unrecognized.

The time for a careful re-evaluation of the need for prevention of disease is imminent. Diag-

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nosis and treatment without prophylaxis and prevention are indeed sterile. What the physician of the future needs is a more than passing acquaintance with biology and a quickened interest in the study of human ecology. What more practical step toward the solution of this dilemma could be designed than the establishment of an Institute of Human Nutrition where the practicing physician could become acquainted with the interaction of agricultural, biologic, geographic, economic, sociologic and psychologic situations which comprise and condition the equilibrium existing between the external and the internal environments of man. The physician must appreciate that medicine in all of its ramifications is a social science, and that his services to society should be consonant with this thesis. A life in which human conservation becomes the major goal should be

the purpose of all of our activities. Any individual who is needlessly wasted or neglected constitutes not only a preventable loss, but an affront to human dignity and a negation of the principle of a free and democratic society.

In summarizing these discursive remarks on the trend of medicine and its significance to the physician, the conclusion is evident that the prevention of disease is assuming greater proportion in our modern world and that the subject matter of diagnosis, treatment, and the prevention of disease should have at *least* equal emphasis in the medical curriculum. Within the field of prevention the theme of human ecology should permeate its entire philosophy, and a first step toward this ideal could be achieved by means of a thorough exploration of the subject matter of nutrition in its relationship to man.

## The Clotting Mechanism and Tests For Its Efficiency\*

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ANYONE who has attempted to review, even most superficially, the literature on the subject of coagulation must be impressed by the tremendous amount of effort that has been expended in the attempt to solve this problem. Theories and more theories have been proposed and arguments between the proponents of the theories have waxed long and loud. Now the modern concept of the clotting mechanism may be presented in its simplest terms as follows:

Thromboplastin + prothrombin + calcium = thrombin. Thrombin + fibrinogen = fibrin. This is our classical theory and is the best working hypothesis that we have. Yet even it does not explain all the problems of the coagulation mechanism, nor do all investigators accept it, at least not in this simple form. It is, of course, this skepticism that stimulates investigation and adds to our knowledge, but in this brief review we cannot discuss fully the disputed points.

What are these substances which we consider essential in this process? Thromboplastin has never been isolated and purified and we know it better by its activity than by any other of its properties. We know that it is a substance which occurs in platelets and in many tissue cells, and we know that it is essential for the conversion of prothrombin to thrombin. It does not occur in circulating blood or at least not in significant amounts. It is set free when platelets disintegrate from any cause, or when tissue is damaged. It is

quite stable when exposed to heat and for that reason it probably cannot be considered to be an enzyme.

Prothrombin is thought to be a protein containing a considerable amount of carbohydrate. It is produced by the liver, possibly to some extent by other tissues. That the liver is the most important source can readily be shown experimentally by causing damage of the liver, following which the prothrombin content of the blood rapidly decreases. For its production, there must be available to the liver an adequate supply of natural Vitamin K or a satisfactory methyl naphthoquinone derivative. The prothrombin of the newborn may be normal or below normal at birth, but regularly the level falls for a few days usually returning to normal by the end of the first week when the intestinal bacterial flora becomes established and produces Vitamin K. If the level falls too low, hemorrhagic disease may occur.

Thrombin results from the activation of prothrombin by thromboplastin in the presence of calcium. It has been shown that a fixed amount of prothrombin yields a constant amount of thrombin, irrespective of the excess of thromboplastin added. Thrombin has been shown to be a protein which also contains carbohydrate. While there is no doubt that calcium is indispensable in the conversion of prothrombin to thrombin, there has been much disagreement as to the role that it plays. It is, of course, by the addition of such substances as the oxalates and citrates which remove or fix the calcium of the blood that clotting is most frequently prevented in blood withdrawn for the purpose of investigation or for trans-

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